



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,076	08/21/2006	Hisayuki Kawamura	294612US0PCT	8092

22850 7590 02/23/2009  
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.  
1940 DUKE STREET  
ALEXANDRIA, VA 22314

EXAMINER
----------

WILLIAMS, AARON

ART UNIT	PAPER NUMBER
----------	--------------

2889

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

02/23/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/590,076	<b>Applicant(s)</b> KAWAMURA ET AL.	
	<b>Examiner</b> Aaron Williams	<b>Art Unit</b> 2889	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/22/2008, 5/27/2008, 11/9/2006, 8/21/2006</u> .              | 6) <input type="checkbox"/> Other: ____.                          |



## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Specification***

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
- 4.

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 13-14, 22, 25-26 are rejected under 35 U.S.C. 102(b) as being anticipated by WIPO Publication WO 01/15244 to Pichler, herein refer to as Pichler.

Regarding claim 1 Pichler discloses an organic electroluminescent device comprising: at least a cathode (Figure 2, electrode (100), abstract) an emitting layer (Figure 2, organic stack (200), abstract), a hole-injecting layer (Figure 2, metal layer (311), abstract) and an anode (Figure 2, electrode (320), abstract) on a substrate in this order; the hole-injecting layer comprising a metal oxide (Figure 2, metal oxide (311), refer to line 19 of page 9).

Regarding claim 2 Pichler discloses the organic electroluminescent device according to claim 1, wherein the hole-injecting layer has a thickness of 40 to 1000 nm (1 to 100 nm, refer to abstract).

Regarding claim 3 Pichler discloses the organic electroluminescent device according to claim 1, wherein the metal oxide (MoOx refer to line 19 of page 9) is an oxide of a metal of the groups 3 to 13 in the long form periodic table.

Regarding claim 4 Pichler discloses the organic electroluminescent device according to claim 1, wherein the metal oxide is one, or two or more metal oxides selected from a molybdenum oxide (MoOx refer to line 19 of page 9), vanadium oxide, hafnium oxide, yttrium oxide, zinc oxide and aluminum oxide.

Regarding claim 13 Pichler discloses an organic electroluminescent device comprising: at least a cathode (Figure 2, electrode (100), abstract), an emitting layer (Figure 2, organic stack (200), abstract), a metal oxide layer (Figure 2, metal layer (311), abstract) and an anode (Figure 2, electrode (320), abstract) on a substrate in this order.

Art Unit: 2889

Regarding claim 14 Pichler discloses the organic electroluminescent device according to claim 13, wherein the metal oxide layer comprises at least one metal oxide selected from a molybdenum oxide (Figure 2, metal oxide (311), refer to line 19 of page 9), vanadium oxide, rhenium oxide, ruthenium oxide, tungsten oxide, zinc oxide, titanium oxide and copper oxide.

Regarding claims 22 Pichler discloses the organic electroluminescent device according to claim 13, wherein the cathode comprises at least one metal selected from alkali metals and alkaline earth metal, and a metal oxide (Figure 2, ITO (320), refer to lines 8-11 of page 7).

Regarding claim 25 Pichler discloses the organic electroluminescent device according to claim 1, wherein the anode is a transparent electrode (Figure 2, Transparent electrode (320), abstract) and the cathode is a reflecting electrode (Figure 2, bottom electrode (100), silicon chip forming this layer intrinsically reflective, refer to line 15 of page 9).

Regarding claim 26 Pichler discloses a display comprising the organic electroluminescent device according to claim 1 refer to claim 1 rejection.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 2889

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 5-9, 12-13, 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent Publication 06-290873 to Shiraishi et al, herein refer to as Shiraishi, and further in view of Japanese Patent Publication 11-307259 to Arai, herein refer to as Arai.

Regarding claim 1 Shiraishi discloses an organic electroluminescent device comprising: at least a cathode (Figure 4, metal electrode (2), abstract) an emitting layer (Figure 4, Luminous layer (4), abstract), a hole-injecting layer (Figure 4, hole-injection (5), abstract) and an anode (Figure 4, Translucency anode (7), abstract) on a substrate in this order

But Shiraishi fails to teach the hole-injecting layer comprising a metal oxide.

Arai teaches a hole-injecting layer comprising a metal oxide (Figure 1, hole-injection layer (23), Abstract). Motivation to combine is to stabilize the hole transporting function, to optimize the recombination area thus increasing the luminous efficiency as stated in paragraph [0013].

Therefore it would have been obvious to one of ordinary skill in the art at the time was made to combine Shiraishi's OLED structure with Arai's hole injection layer structure to increase the luminous efficiency.

Regarding claim 5 Shiraishi-Arai discloses the organic electroluminescent device according to claim 1, Arai further teaches wherein the hole-injecting layer comprises 0.01 to 50 atm % of the metal oxide refer to paragraph [0017].

Regarding claim 6 Shiraishi-Arai discloses the organic electroluminescent device according to claim 1, Shiraishi further teaches wherein a protecting layer (Figure 4, Metallic thin film layer (6), abstract) is provided between the hole-injecting layer and the anode.

Regarding claim 7 Shiraishi-Arai discloses the organic electroluminescent device according to claim 6, Shiraishi further teaches wherein the protecting layer comprises a metal (Figure 4, Metallic thin film layer (6), abstract).

Regarding claim 8 Shiraishi-Arai discloses the organic electroluminescent device according to claim 7, Shiraishi further teaches wherein the protecting layer comprises Ag, Au or an alloy thereof refer to paragraph [0021].

Regarding claim 9 Shiraishi-Arai discloses the organic electroluminescent device according to claim 6, Shiraishi further teaches wherein the protecting layer comprises a semiconductor refer to paragraph [0021]. It is well known in the art that copper when oxide during electron beam evaporation is a semiconductor material.

Regarding claim 10 Shiraishi-Arai discloses the organic electroluminescent device according to claim 6, Shiraishi further teaches wherein the protecting layer comprises an insulator refer to paragraph [0021].

Regarding claim 12 Shiraishi-Arai discloses the organic electroluminescent device according to claim 1, Shiraishi further teaches wherein an electron-transporting layer (Figure 4, electron injecting layer (3), abstract) is provided between the cathode and the emitting layer.



Regarding claim 13 Shiraishi discloses an organic electroluminescent device comprising: at least a cathode (Figure 4, metal electrode (2), abstract), an emitting layer (Figure 4, Luminous layer (4), abstract), and an anode (Figure 4, Translucency anode (7), abstract) on a substrate in this order.

But Shiraishi fails to teach the hole-injecting layer comprising a metal oxide.

Arai teaches a hole-injecting layer comprising a metal oxide (Figure 1, hole-injection layer (23), Abstract). Motivation to combine is to stabilize the hole transporting function, to optimize the recombination area thus increasing the luminous efficiency as stated in paragraph [0013].

Therefore it would have been obvious to one of ordinary skill in the art at the time was made to combine Shiraishi's OLED structure with Arai's hole injection layer structure to increase the luminous efficiency.

Regarding claim 25 Shiraishi-Arai discloses the organic electroluminescent device according to claim 1, Shiraishi further teaches wherein the anode is a transparent electrode and the cathode is a reflecting electrode.

Regarding claim 26 Shiraishi-Arai discloses a display comprising the organic electroluminescent device according to claim 1.

5. Claims 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over WIPO Publication WO 01/15244 to Pichler, herein refer to as Pichler, and further in view of United States Patent Grant Publication 2003/0234609 to Aziz et al., herein refer to as Aziz.

Regarding claim 15 Pichler discloses the organic electroluminescent device according to claim 13.

But Pichler fails to teach wherein the anode comprises a conductive film and a protecting film in this order from the substrate.

However Aziz teaches wherein the anode (Figure 15, first electrode (850), refer to paragraph [0204]) comprises a conductive film (Figure 15, capping region (856), paragraph [0204]) and a protecting film (Figure 15, MOML (854), paragraph [204]) in this order from the substrate. Motivation to combine is to reduce ambient light reflection, thereby increasing contrast, and to reduce unstable conditions in the OLED as stated in paragraph [0006].

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Pichler OLED structure with Aziz anode structure to increase the contrast of the OLED. Aziz and Pichler are in the same field of endeavor optimizing OLEDs.

Regarding claim 16 Pichler-Aziz disclose the organic electroluminescent device according to claim 15, Aziz further teaches wherein the protecting film comprises an oxide, a nitride or an oxynitride of at least one element selected from Si, Ge, Mg, Ta, Ti, Zn, Sn, In, Pb and Bi refer to paragraph [0210].

Regarding claim 17 Pichler-Aziz disclose the organic electroluminescent device according to claim 15, Aziz further teaches wherein the protecting film comprises an oxide, a nitride or an oxynitride of at least one element selected from the group

Art Unit: 2889

consisting of Mo, V, Cr, W, Ni, Co, Mn, Ir, Pt, Pd, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Er and Yb refer to paragraph [0210].

Regarding claim 18 Pichler-Aziz discloses the organic electroluminescent device according to claim 15, Aziz further teaches wherein the protecting film transmits light refer to paragraph [0232].

Regarding claim 19 Pichler-Aziz discloses the organic electroluminescent device according to claim 15, Aziz further teaches wherein a metal layer is provided between the conductive film and the protecting film refer to paragraph [0221].

Regarding claim 20 Pichler-Aziz disclose the organic electroluminescent device according to claim 15, Aziz further teaches wherein a metal layer is provided between the metal oxide layer and the anode, or the emitting layer and the metal oxide layer refer to paragraph [0221].

Regarding claim 21 Pichler-Aziz disclose the organic electroluminescent device according to claim 19, Aziz further teaches wherein the metal layer comprises an alloy containing at least one metal selected from Mg, Ag and Zr refer to paragraph [0221].

6. Claims 11, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over WIPO Publication WO 01/15244 to Pichler, herein refer to as Pichler, and further in view of Japanese Patent Publication 10-294182 to Shoji et al., herein refer to as Shoji.

Regarding claim 11 Pichler discloses the organic electroluminescent device according to claim 1.

Art Unit: 2889

But Pichler fails to teach wherein an insulative layer is provided between the cathode and the emitting layer.

However Shoji teaches an insulative layer (Figure 5, Transparent dielectric thin film ( $\text{TiO}_2$ ) layer (5), refer to paragraphs [0047]-[0048] is provided between the cathode and the emitting layer. Motivation to combine is to lower resistance the cathode layer and increase the optical transmittance of the device as stated in paragraph [0047].

Therefore it would have been obvious to one of ordinary skill at the time the invention was made to combine Shoji insulative layer with Pichler OLED device to increase the optical transmittance of the device. Shoji and Pichler are in the same field of endeavor organic light emitting device.

Regarding claim 27 Pichler-Shoji disclose the organic electroluminescent device according to claim 11, Shoji further teaches wherein an electron-transporting layer is provided between the insulative layer and the emitting layer.

Claims 23, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over WIPO Publication WO 01/15244 to Pichler, herein refer to as Pichler, and further in view of US Patent 5,995,359 to Klee et al., herein refer to Klee.

Regarding claim 23 Pichler discloses the organic electroluminescent device according to claim 22.

Art Unit: 2889

But Pichler fails to disclose wherein the metal oxide contained in the cathode is at least one metal oxide selected from  $\text{Li}_x\text{Ti}_2\text{O}_4$ ,  $\text{Li}_x\text{V}_2\text{O}_4$ ,  $\text{Er}_x\text{NbO}_3$ ,  $\text{La}_x\text{TiO}_3$ ,  $\text{Sr}_x\text{VO}_3$ ,  $\text{Ca}_x\text{CrO}_3$  and  $\text{Sr}_x\text{CrO}_3$  (X is 0.2 to 5).

However Klee teaches wherein the metal oxide contained in the cathode is at least one metal oxide selected from  $\text{Li}_x\text{Ti}_2\text{O}_4$ ,  $\text{Li}_x\text{V}_2\text{O}_4$ ,  $\text{Er}_x\text{NbO}_3$ ,  $\text{La}_x\text{TiO}_3$ ,  $\text{Sr}_x\text{VO}_3$ ,  $\text{Ca}_x\text{CrO}_3$  and  $\text{Sr}_x\text{CrO}_3$  (X is 0.2 to 5) refer to the abstract. The motivation to combine is Pichler OLED with Klee's cathode is to improve adhesion to a substrate which improves the operation of the functional layers of a device as stated in lines 13-17 of column 3.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Pichler OLED with Klee's cathode is to improve adhesion to a substrate which improves the operation of the functional layers.

Regarding claim 24 Pichler discloses the organic electroluminescent device according to claim 22.

But fails to teach wherein the metal oxide contained in the cathode is at least one metal oxide selected from  $\text{A}_x\text{MoO}_3$  (A is K, Cs, Rb, Sr, Na, Li or Ca) (x is 0.2 to 5) and  $\text{A}_x\text{V}_2\text{O}_5$  (A is K, Cs, Rb, Sr, Na, Li or Ca) (x is 0.2 to 5).

However Klee teaches wherein the metal oxide contained in the cathode is at least one metal oxide selected from  $\text{A}_x\text{MoO}_3$  (A is K, Cs, Rb, Sr, Na, Li or Ca) (x is 0.2 to 5) and  $\text{A}_x\text{V}_2\text{O}_5$  (A is K, Cs, Rb, Sr, Na, Li or Ca) (x is 0.2 to 5) refer to the abstract. The motivation to combine is Pichler OLED with Klee's cathode is to improve adhesion to a substrate which improves the operation of the functional layers of a device as stated in lines 13-17 of column 3.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Pichler OLED with Klee's cathode is to improve adhesion to a substrate which improves the operation of the functional layers.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron Williams whose telephone number is (571) 270-5279. The examiner can normally be reached on Monday thru Friday 7:00 to 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Toan Ton can be reached on (571)272-2303. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Aaron Williams/  
Examiner, Art Unit 2889

/Toan Ton/  
Supervisory Patent Examiner  
Art Unit 2889

Application/Control Number: 10/590,076  
Art Unit: 2889

Page 13